ESA Section 7 Consultation No: 2003/00283

National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Consultation and Magnuson-Stevens Act Essential Fish Habitat (EFH) Consultation

Action Agencies: The National Marine Fisheries Service (NMFS)
The Bonneville Power Administration (BPA)

Species/ESU Affected: Threatened Ozette Lake Sockeye Salmon *(Oncorhynchus nerka)*

EFH Affected: Pacific salmon, groundfish, and coastal pelagic species

Location: Columbia River Plume off the Oregon and Washington Coast

Actions Issuance of Permit No. 1410 - to the Northwest Fisheries Science Center (NWFSC).

Consultation Conducted By: Protected Resources Division (PRD) of the Northwest Region, NMFS (Consultation Number 2003/00283)

Approved By: _____ for D. Robert Lohn, Regional Administrator

Date: **June 23, 2003** (**Expires on:** December 31, 2007)

This biological opinion (Opinion) is NMFS' review of a proposed Endangered Species Act (ESA) section 10(a)(1)(A) permit action described below. It has been prepared in accordance with section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 et seq.). This Opinion is based on information provided in the application for the proposed permit, comments from reviewers, published and unpublished scientific information on the biology and ecology of threatened salmonids in the action area, and other sources of information. A complete administrative record of this consultation is on file with the NMFS' Northwest Region (NWR) in Portland, Oregon.

NMFS concludes that issuing the proposed ESA section 10(a)(1)(A) permit discussed in this biological opinion is not likely to jeopardize the continued existence of threatened Ozette Lake sockeye salmon. Further, the action is not likely to adversely affect any designated EFH.

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CONSULTATION HISTORY

Proposed New Permit 1410 - NWFSC

NMFS proposes to issue one new permit to the NWFSC authorizing scientific research studies on threatened Ozette Lake sockeye salmon. Though the proposed permit action may affect other species as well, this Opinion constitutes formal consultation and an analysis of effects solely for Ozette Lake sockeye salmon.

On February 3, 2003, NMFS PRD received a request from the NWFSC for a permit to be issued for salmon research. It was deemed incomplete when it arrived at the PRD. NMFS PRD requested additional information to complete the application. When that information was received the application was determined to be complete. Notice was published in the *Federal Register* on March 13, 2003 (68 FR 23107) asking for public comment. The public was given 30 days to review the application, and once that period closed, the consultation began. The PRD in Portland, Oregon maintains the complete history for the proposed action in the administrative record for this consultation and for this permit.

DESCRIPTION OF THE PROPOSED PERMIT ACTION

Elements Common to Research Permits

Research permits list conditions to be followed before, during, and after the research activities are conducted. These conditions are intended to: (a) ensure compliance with the ESA; (b) manage the interaction between scientists by requiring coordination of research activities among permit holders and between permit holders and NMFS; (c) require measures to minimize impacts on target species; (d) and report information to NMFS on the nature and impact of the research activities on the species of concern.

ESA Section 10(a)(1)(A) Scientific Research Permit Terms and Conditions

The following conditions will be in all permits and permit modifications. In all cases:

1. The permit holder must ensure that listed species are taken only at the levels, by the means, in the areas and for the purposes stated in the permit application, and according to the terms and conditions in this permit.

2. The permit holder must not intentionally kill or cause to be killed any listed species unless the

permit specifically allows intentional lethal take.

3. The permit holder must handle listed fish with extreme care and keep them in cold water to the maximum extent possible during sampling and processing procedures. When fish are transferred or held, a healthy environment must be provided; e.g., the holding units must contain adequate amounts of well-circulated water. When using gear that captures a mix of species, the permit holder must process listed fish first to minimize handling stress.

4. The permit holder must stop handling listed juvenile fish if the water temperature exceeds 70 degrees Fahrenheit at the capture site. Under these conditions, listed fish may only be visually identified and counted.

5. If the permit holder anesthetizes listed fish to avoid injuring or killing them during handling, the fish must be allowed to recover before being released. Fish that are only counted must remain in water and not be anesthetized.

6. The permit holder must use a sterilized needle for each individual injection when passive integrated transponder tags (PIT-tags) are inserted into listed fish.

7. If the permit holder incidentally captures any listed adult fish while sampling for juveniles, the adult fish must be released without further handling and such take must be reported.

8. The permit holder must exercise care during spawning ground surveys to avoid disturbing listed adult salmonids when they are spawning. Researchers must avoid walking in salmon streams whenever possible, especially where listed salmonids are likely to spawn. Visual observation must be used instead of intrusive sampling methods, especially when just determining presence of anadromous fish.

9. The permit holder using backpack electrofishing equipment must comply with NMFS' Backpack Electrofishing Guidelines (June 2000) available at http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf.

10. The permit holder must obtain approval from NMFS before changing sampling locations or research protocols.

11. The permit holder must notify NMFS as soon as possible but no later than 2 days after any authorized level of take is exceeded or if such an event is likely. The permit holder must submit a written report detailing why the authorized take level was exceeded or is likely to be exceeded.

12. The permit holder is responsible for any biological samples collected from listed species as long as they are used for research purposes. The permit holder may not transfer biological samples to anyone not listed in the application without prior written approval from NMFS.

13. The person(s) actually doing the research must have a copy of this permit while conducting the authorized activities.

14. The permit holder must allow any NMFS employee or representative to accompany field personnel while they conduct the research activities.

15. The permit holder must allow any NMFS employee or representative to inspect any records or facilities related to the permit activities.

16. The permit holder may not transfer or assign this permit to any other person as defined in Section 3(12) of the ESA. This permit ceases to be in effect if transferred or assigned to any other person without NMFS' authorization.

17. NMFS may amend the provisions of this permit after giving the permit holder reasonable notice of the amendment.

18. The permit holder must obtain all other Federal, state, and local permits/authorizations needed for the research activities.

19. On or before January 31th of every year, the permit holder must submit to NMFS a post-season report in the prescribed form describing the research activities, the number of listed fish taken and the location, the type of take, the number of fish intentionally killed and unintentionally killed, the take dates, and a brief summary of the research results. Falsifying annual reports or permit records is a violation of this permit.

20. If the permit holder violates any permit term or condition they will be subject to any and all penalties provided by the ESA. NMFS may revoke this permit if the authorized activities are not conducted in compliance with the permit and the requirements of the ESA or if NMFS determines that its ESA section 10(d) findings are no longer valid.

Additional permit conditions specific to the proposed research are included in the description of the permit action below.

The activities identified in the proposed permit action will be funded by BPA. This agency is also responsible for complying with section 7 of the ESA because it is funding activities that may affect listed species, therefore this consultation examines the activities it proposes to fund and thus will fulfill its section 7 consultation requirements.

Finally, NMFS will monitor actual annual takes of ESA-listed fish species associated with scientific research activities, by requiring annual reports or by other means, and shall adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels are determined to operate to the disadvantage of the ESA-listed species.

The Proposed Permit

The following information discusses the overall amounts of take being requested in the permit application, the general actions with which that take would be associated, and general location of research activities. "Take" is defined in section 3 of the ESA; it means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or to attempt to engage in any such conduct. Detailed, action-by-action breakdowns (i.e., how much take is associated with each activity in the permit) are found in the Determination of Effects section. The new permit action considered in this Opinion would be in effect until December 31, 2007.

Survival and growth of juvenile salmonids in the Columbia River Plume

The NWFSC in Seattle, Washington requests a permit for annual take of several listed ESUs; however, this Opinion will analyze only those studies affecting threatened Ozette Lake sockeye salmon. The NWFSC proposes to investigate the distribution, abundance, condition and health of juvenile salmon in relation to physical and biological oceanographic conditions in the Columbia River plume and surrounding ocean environment to better understand factors controlling estuarine and marine survival. The study will provide information to help predict and forecast survival potential as a function of easily measured indices of plume and ocean conditions. Further, the information will help hydropower operators develop a set of hydropower management scenarios that could benefit survival, growth, and health of juvenile salmon by changing the dynamics of the Columbia River plume. Listed fish will be collected with purse seines and trawl nets. The NWFSC is requesting authorization to intentionally kill 10 juvenile Ozette Lake sockeye salmon for endocrine assessments, genetic stock identification, pathogen prevalence and intensity, otolith and stomach content analysis, and histopathological attributes.

The Action Area

The action area is defined as the geographic extent of all direct and indirect effects of a proposed agency action [50 C.F.R. 402.02 and 402.14(h)(2)]. The action area for this consultation includes the Columbia River plume and the surrounding marine areas off of the Oregon and Washington coast used by Ozette Lake sockeye salmon for juvenile emigration, early rearing, and returning adult migration. The range of the ESU also includes all lake areas and river reaches accessible to listed sockeye salmon in Ozette Lake, located in Clallam County, Washington, and the Ozette River.

STATUS OF THE SPECIES UNDER THE ENVIRONMENTAL BASELINE

To qualify for listing as a threatened species, Ozette Lake sockeye salmon must constitute "species" under the ESA. The ESA defines a "species" to include "any subspecies of fish, wildlife, or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." On November 20, 1991, NMFS published a policy (56 FR 58612) describing the agency's application of the ESA definition of "species" to Pacific salmonid species. This policy provides that a Pacific salmonid population will be considered distinct, and hence a species under the ESA, if it represents an ESU of the biological species. The population must satisfy two criteria to be considered an ESU: (1) It must be reproductively isolated from other conspecific population units, and (2) it must represent an important component in the evolutionary legacy of the biological species. The first criterion, reproductive isolation, need not be absolute, but must be strong enough to permit evolutionarily important differences to accrue in different population units. The second criterion would be met if the population contributed substantially to the ecological/genetic diversity of the species as a whole. Further guidance on the application of this policy is contained in "Pacific salmon (*Oncorhynchus* spp.) and the Definition of Species under the ESA" (Waples, 1991) and a NOAA Technical Memorandum "Definition of 'Species' Under the Endangered Species Act: Application to Pacific Salmon" (NMFS F/NWC-1994).

Status of Ozette Lake Sockeye Salmon

On March 25, 1999, NMFS listed Ozette Lake sockeye salmon ESU, as a threatened species. The ESU includes all naturally spawned populations of sockeye salmon in Ozette Lake and streams and tributaries flowing into Ozette Lake, Washington (64 FR 14528). The Ozette Lake sockeye salmon were listed as threatened under the ESA because NMFS determined that a number of factors—both environmental and demographic—had caused them to decline to the point where they were likely to be in danger of going extinct within the foreseeable future. These factors for decline affect their biological requirements at every stage of their lives and they arise from a number of different sources. This section of the Opinion explores those effects and defines the context within which they take place and provides information about their current status.

Life History of Sockeye Salmon

On the Pacific coast, sockeye salmon inhabit riverine, marine, and lake environments from the Columbia River and its tributaries north and west to the Kuskokwim River in western Alaska (Burgner 1991). Among the Pacific salmon, sockeye salmon exhibit the greatest diversity in selection of spawning habitat and great variation in river entry timing and the duration of holding in lakes prior to spawning. Adaptation to a greater degree of utilization of lake environments for

both adult spawning and juvenile rearing has resulted in the evolution of complex timing for incubation, fry emergence, spawning, and adult lake entry that often involves intricate patterns of adult and juvenile migration and orientation not seen in other *Oncorhynchus* species (Burgner 1991).

The vast majority of sockeye salmon spawn in either inlet or outlet streams of lakes or in lakes themselves. The offspring of "lake-type" sockeye salmon utilize lake environments for juvenile rearing for 1 to 3 years and then migrate to sea, returning to the natal lake system to spawn after spending 1 to 4 years in the ocean. However, some populations of sockeye salmon spawn in rivers without juvenile lake-rearing habitat (Foerster 1968, Burgner 1991). The offspring of these riverine spawners utilize slow-velocity sections of rivers as juvenile rearing habitat for 1 or 2 years ("river-type" sockeye salmon), or migrate to sea as underyearlings and therefore, rear primarily in saltwater ("sea-type" sockeye salmon) (Birtwell et al. 1987; Wood et al. 1987; Heifitz et al. 1989; Murphy et al. 1988, 1989, and 1991; Lorenz and Eiler 1989; Eiler et al. 1992; and Wood 1995). Like lake-type sockeye salmon, river/sea-type sockeye salmon return to natal spawning habitat after 1 to 4 years in the ocean. There are also *O. nerka* life forms that are non-anadromous known as kokanee.

Ozette Lake Sockeye Salmon Life History

Adult Ozette Lake sockeye salmon enter Ozette Lake through the Ozette River from April to early August, holding three to nine months in Ozette Lake prior to spawning in late October through January. Sockeye salmon spawn primarily in lakeshore upwelling areas in Ozette Lake (particularly at Allen's Bay and Olsen's Beach). Minor spawning may occur below Ozette Lake in the Ozette River or in Coal Creek, a tributary of the Ozette River. Sockeye salmon do not presently spawn in tributary streams to Ozette Lake, although they may have spawned there historically. Eggs and alevins remain in gravel redds until the fish emerge as fry in spring. Fry then migrate immediately to the limnetic zone in Ozette Lake, where the fish rear. After one year of rearing, in late spring, Ozette Lake sockeye salmon emigrate seaward as age-1+ smolts. The majority of Ozette Lake sockeye salmon return to spawn as four year old adult fish, having spent one winter in fresh water and two winters at sea.

Overview—Status of the Ozette Lake Sockeye Salmon

To determine a species' status under extant conditions (usually termed "the environmental baseline"), it is necessary to ascertain the degree to which the species' biological requirements are being met at the time of the proposed action and in the action area. For the purposes of this consultation, Ozette Lake sockeye salmon's biological requirements are expressed in two ways: population parameters such as fish numbers, distribution, and trends throughout the action area; and the condition of various essential habitat features such as water quality, substrate condition,

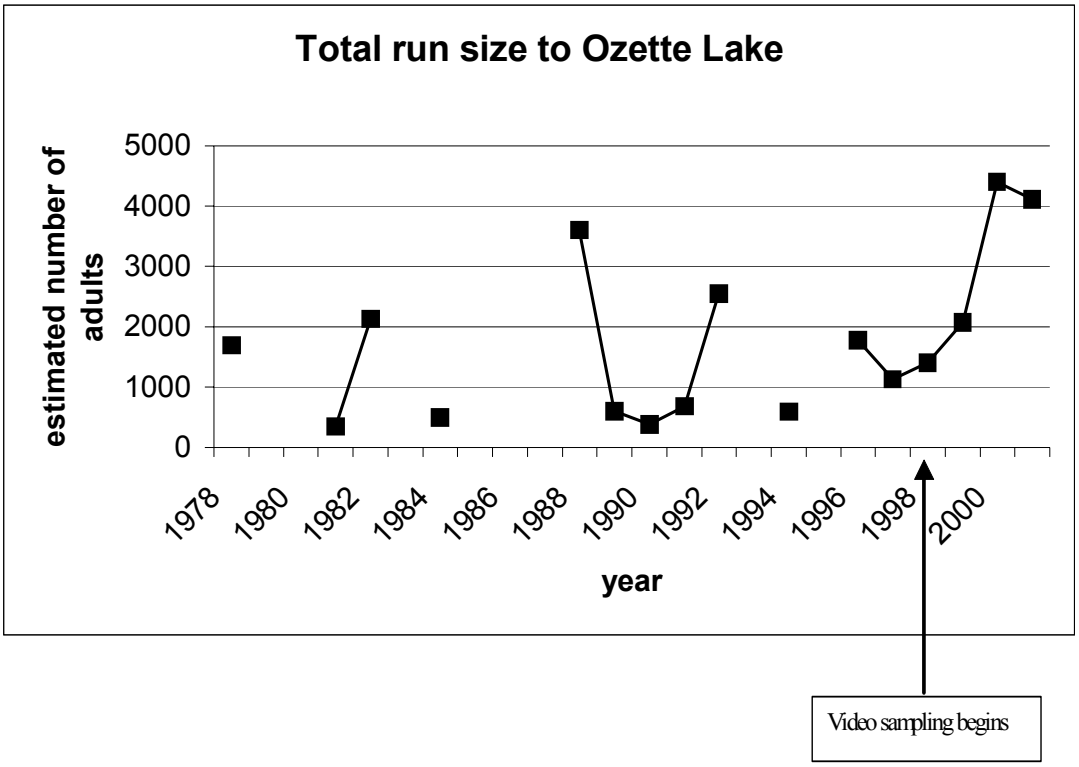

Figure 1. Estimated numbers of adult sockeye entering Lake Ozette from 1978 to 2001. (Source: Mike Crewson, Makah Fisheries, unpublished data).

and food availability. Clearly, these two types of information are interrelated; the condition of a given habitat has a great deal of impact on the number of fish it can support. Nonetheless, it is useful to separate the species' biological requirements into these parameters because doing so is a good way to get a full picture of all the factors affecting Ozette Lake sockeye salmon survival and the response to those factors. Therefore, the discussion to follow will be divided into two parts: (1) Species Distribution and Trends and (2) Factors Affecting the Environmental Baseline.

Ozette Lake Sockeye Salmon Distribution and Trends

The major abundance data series for Ozette River sockeye salmon consist of escapement estimates derived from counts at a weir located at the outlet of Ozette Lake. Counting has occurred in most years since 1977 (Dlugokenski et al. 1981, WDF et al. 1993). The estimates of total run size have been revised upwards since the time of the last Ozette Lake sockeye salmon status review in 1997, due to resampling of data using new video camera counting technology (Figure 1). The Makah Fisheries biologists estimate that previous counts of adult sockeye

returning to the lake have been underestimates, and they have attempted to correct run-size estimates based on their assessments of human error and variations in inter-annual run-timing (Makah Fisheries 2000).

Because of the concerns about the status of Ozette Lake sockeye, the Lake Ozette Steering Committee was established (comprised of the Makah tribe, Olympic National Park, Washington Department of Fish and Wildlife, and citizen groups) to organize recovery activities for sockeye. Makah Fisheries initiated a hatchery program designed to supplement existing beach spawners in 1983 (beach spawner supplementation ceased with the 1995 broodyear) and later to introduce sockeye to lake tributaries (intentional releases to tributaries began in broodyear 1992). Therefore, all of the abundance information presented contains an unknown fraction of hatchery fish. However, based on examination of carcasses retrieved for otolith marks applied to hatchery fish, straying of hatchery fish appears to be very low (Makah Fisheries 2000).

Historical estimates indicate run sizes of a few thousand sockeye salmon in 1926 (Rounsefell and Kelez 1938), with a peak recorded harvest of nearly 18,000 in 1949 (WDF 1974). Subsequently, commercial harvest declined steeply to only a few hundred fish in the mid-1960s and was ended in 1974. A small ceremonial and subsistence fishery continued up until 1981 (Dlugokenski et al. 1981); there has been no direct fishery on this stock since 1982 (WDF et al. 1993). Harvest of sockeye salmon in the Ozette River fluctuated considerably over time, which would indicate similar fluctuations in spawner abundance if harvest rates were fairly constant. Assuming that Ozette River harvest consisted of sockeye salmon destined to spawn in this system, comparison of these estimates indicates that recent abundance is substantially below the historical abundance range for this ESU.

The Makah Fisheries biologists estimate that previous counts of adult sockeye returning to the lake have been underestimates, and they have attempted to correct run-size estimates based on their assessments of human error and variations in inter-annual run-timing (Makah Fisheries 2000; Table 1). The run-size estimates are very uncertain—an estimate of the 95% confidence interval around the 2001 count is N = 3,717 (2,815 – 5,416) (J. Fieberg memo to A. Ritchie and M. Crewson, September, 2002). The most recent 5-year geometric mean of sockeye returning to Ozette Lake is 2,267 adults. Since run-size estimates before 1998 are likely to be even more unreliable than recent counts, and the new counting technology has resulted in an increase in estimated run sizes, no statistical estimation of trends is reported. The current trends in abundance are unknown for the beach spawning aggregations. Although overall abundance appears to have declined from historical levels, it is not known whether this resulted in fewer spawning aggregations, lower abundances at each aggregation, or both.

While we currently lack data on naturally produced Ozette Lake sockeye salmon production, it is possible to make rough estimates of juvenile abundance from adult return data. By applying the 1986-1998 average fecundity of 3,097 eggs, and a deposited egg to swim-up fry survival rate of 10% (NMFS 2002a) per female value to the estimated 1133 females returning (half of the 5-year

geometric mean of 2,267) recent annual production may be estimated to be 350,890 fry.
Table 1. Estimated run size, natural origin recruits (NOR) to Lake Ozette and to Umbrella Creek (UC), and the fraction of fish returning to Umbrella Creek that are of hatchery origin in Lake Ozette sockeye salmon from 1978-2001 (Makah Fisheries 2000, M. Crewson, Makah Fisheries, unpublished data).

Year	Total Run Size	Lake NOR	UC NOR	UC Hatchery Origin
1978	1,690	nd	nd	nd
1979	nd	nd	nd	nd
1980	nd	nd	nd	nd
1981	350	nd	nd	nd
1982	2,123	nd	nd	nd
1983	nd	nd	nd	nd
1984	502	nd	nd	nd
1985	nd	nd	nd	nd
1986	nd	nd	nd	nd
1987	nd	nd	nd	nd
1988	3,599	nd	nd	nd
1989	603	nd	nd	nd
1990	385	nd	nd	nd
1991	684	nd	nd	nd
1992	2,548	nd	nd	nd
1993	nd	nd	nd	nd
1994	585	nd	nd	nd
1995	nd	nd	nd	44
1996	1,778	1,699	79	0
1997	1,133	998	nd	135
1998	1,406	1,310	nd	96
1999	2,076	1,676	149	251
2000	4,399	1,293		3,106
2001	4,116	591	3,525	

Current fry to smolt survival rates in the lake for these natural-origin fry are unknown.

Factors Affecting the Environmental Baseline

Environmental baselines for biological opinions are defined by regulation at 50 CFR 402.02, which states that an environmental baseline is the physical result of all past and present state, Federal, and private activities in the action area along with the anticipated impacts of all

proposed Federal projects in the action area (that have already undergone formal or early section 7 consultation). The environmental baseline for this biological opinion is therefore the result of the impacts that many activities (summarized below) have had on Ozette Lake sockeye salmon's survival and recovery. The baseline is the culmination of these effects on these species' biological requirements and, by examining those individual effects, it is possible to derive the species' status in the action area.

The biological requirements for Ozette Lake sockeye salmon in the action area can best be expressed in terms of the essential features of their habitat. That is, the salmon require adequate: (1) substrate (especially spawning gravel), (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) migration conditions (65 FR 7764). The best scientific information presently available demonstrates that a multitude of factors, past and present, have contributed to the decline of west coast salmonids by adversely affecting these essential habitat features.

Several potential factors contributing to Ozette sockeye decline have been investigated. Factors such as predation by birds, seals and other marine mammals; introduced non-native diseases or parasites; loss of tributary populations; decline in quality of beach-spawning habitat; historical over-fishing; poor marine survival; excess logging; potential genetic effects of present hatchery production and past interbreeding with genetically dissimilar kokanee; and the synergistic cumulative effects of these factors remain potential explanations for the declines (Beauchamp et al. 1995, Adkinson and Burgner 1996, Geiger 1996, Jacobs et al. 1996, Lestelle 1996, Makah Fisheries Management (MFM) 2000/2001). In the tributaries and on certain lake beaches, these factors are believed to have resulted in extirpation of locally adapted spawning aggregations and life history strategies necessary for successful spawning. Factors such as water quality and Ozette sockeye physical and intra- and inter-specific competition appear not to be contributing to the sockeye declines (Adkinson and Burgner 1996, Geiger 1996, Jacobs et al. 1996). There has been no directed harvest on Ozette Lake sockeye since 1982, and commercial fisheries stopped in 1974 (Gustafson et al. 1997, Makah Fisheries 2000). For further detailed information on how various factors have degraded essential habitat features affecting Ozette Lake sockeye salmon, please see the following: Makah and NMFS MML (2000), NMFS (1997), NMFS (1999a), NMFS (2002a), NMFS (2003b), and NMFS (2003).

Ozette Lake sockeye, like other ESA-listed fish, are the subject of scientific research and monitoring activities. Most biological opinions issued by NMFS have conditions requiring specific monitoring, evaluation, and research projects to gather information to aid the survival of listed fish. For example, research: (1) increases what is known about the listed species and their biological requirements, (2) answers key questions associated with difficult resource issues that crop up in every management arena and involve every salmonid life history stage (particularly the resource issues discussed in the previous section), and (3) helps resource managers plan for the recovery of listed species. In any case, scientific research and monitoring efforts (unlike the other factors described in the previous section) are not considered to be a factor contributing to

the decline of Ozette Lake sockeye salmon, and NMFS believes that the information derived from the research activities is essential to their survival and recovery.

The picture of whether Ozette Lake sockeye salmon's biological requirements are being met is clear-cut for habitat-related parameters and for population factors; given all the factors for decline—even taking into account the corrective measures being implemented[1]—it is clear that their biological requirements are currently not being met under the environmental baseline. Their status is such that there must be a significant improvement in the environmental conditions of the species' respective habitats (over those currently available under the environmental baselines). Any further degradation of the environmental conditions would have a significant impact due to the amount of risk the species presently faces under the environmental baselines. In addition, there must be considerable improvements to minimize effects due to habitat degradation, predation, hatchery practices, and unfavorable marine conditions.

EFFECTS OF THE ACTION

The purpose of this section is to identify the effects NMFS' issuance of a scientific research permit will have on threatened Ozette Lake sockeye salmon. To the extent possible, this will include analyses of effects at the population level. Where information on Ozette Lake sockeye salmon is scarce at the population level, this analysis assumes that the status of each affected population is the same as the ESU as a whole. Analyses of effects will not include hatchery stocks because NMFS considers these stocks nonessential to the ESU's recovery.

Evaluating the Effects of the Action

Over the course of several years and numerous ESA section 7 consultations, NMFS developed the following four-step approach for using the ESA Section 7(a)(2) standards to determine what effect a proposed action is likely to have on a given listed species. What follows here is a summary of that approach.

1. Define the biological requirements and current status of each listed species.

2. Evaluate the relevance of the environmental baseline to the species' current status.

[1] Please see the following document for a summary of implemented and proposed conservation efforts: Lake Ozette Sockeye Salmon Resource Management Plan-Hatchery and Genetic Management Plan Component, (NMFS 2002a).

3. Determine the effects of the proposed or continuing action on listed species and their habitat.

4. Determine whether the species can be expected to survive with an adequate potential for recovery under (a) the effects of the proposed (or continuing) action, (b) the effects of the environmental baseline, and (c) any cumulative effects—including all measures being taken to improve salmonid survival and recovery.

The fourth step above requires a two-part analysis. The first part focuses on the action area and defines the proposed action's effects in terms of the species' biological requirements in that area (i.e., impacts on essential habitat features). The second part focuses on the species itself. It describes the action's impact on individual fish—or populations, or both—and places that impact in the context of the ESU as a whole. Ultimately, the analysis seeks to answer the questions of whether the proposed action is likely to jeopardize a listed species' continued existence or destroy or adversely modify its designated critical habitat.

Critical habitat was designated for Ozette Lake sockeye salmon on February 16, 2000 when NMFS published a final rule in the Federal Register (65 FR 7764). However, the critical habitat designation for Ozette Lake sockeye salmon was vacated and remanded to NMFS for new rulemaking pursuant to a court order in April 2002. In the absence of a new rule designating critical habitat for Ozette Lake sockeye, this consultation will include an evaluation of the effects of the proposed actions on the species' habitat to determine whether those actions are likely to jeopardize the continued existence of the species.

Description of Effects on Ozette Lake Sockeye Salmon Habitat

Previous sections have described the scope of the habitat in the action area and the range of the ESU, the essential features of Ozette Lake sockeye habitat, and depicted its present condition. The discussion here focuses on how those features are likely to be affected by the proposed actions.

A full description of the proposed activity is found in the next section. In general, the activity will capture fish with nets of various types. All of these techniques are minimally intrusive in terms of their effect on habitat. None of them will measurably affect any of the 10 essential fish habitat features listed earlier (i.e., stream substrates, water quality, water quantity, food, streamside vegetation, etc.). Moreover, the proposed activity is of short duration and will take place in coastal waters. Therefore, NMFS concludes that the proposed activities are unlikely to adversely modify Ozette Lake sockeye salmon habitat.

Effects on Ozette Lake Sockeye Salmon

The primary effects the proposed activity will have on Ozette Lake sockeye salmon will be in the form of intentional "take" (the ESA take definition is given in the section introducing the permit) in the form of killing the fish. The following section discusses the general effects known to be caused by the proposed activity, regardless of where they occur or what species are involved.

Intentional Mortality/Sacrifice

In some instances, it is necessary to kill a captured fish in order to gather whatever data a study is designed to produce. In such instances, determining the effect is very straightforward: The sacrificed fish, if juveniles, are forever removed from the ESU's gene pool. If the fish are adults, the effect depends upon whether they are killed before or after they have a chance to spawn. If they are killed after they spawn, there is very little overall effect save for removing the nutrients their bodies would have provided to the spawning grounds. If they are killed before they spawn, not only are they removed from the ESU, but so are all their potential progeny. Hence, killing pre-spawning adults has the greatest potential to affect their ESU. NMFS rarely allows this to happen. If it does—it does so in very low numbers. Also the adults are stripped of sperm and eggs so their progeny can be raised in a controlled environment such as a hatchery—thereby greatly decreasing the potential harm posed by sacrificing the adults.

Benefits of Research

Under section 10(d) of the ESA, NMFS is prohibited from issuing a section 10(a)(1)(A) permit unless NMFS finds that the permit: (1) was applied for in good faith; (2) if granted and exercised, will not operate to the disadvantage of the endangered and/or threatened species that is/are the subject of the permit; and (3) is consistent with the purposes and policy of section 2 of the ESA. In addition, NMFS does not issue a section 10(a)(1)(A) permit unless the proposed activities are likely to result in a net benefit to the ESA-listed species that is/are the subject of the permit; benefits accrue from the acquisition of scientific information.

For more than a decade, research and monitoring activities conducted with anadromous salmonids in the Pacific Northwest have provided resource managers with a wealth of important and useful information on anadromous fish populations. For example, juvenile fish trapping efforts have enabled the production of population inventories, PIT-tagging efforts have increased the knowledge of anadromous fish migration timing and survival, and fish passage studies have provided an enhanced understanding of fish behavior and survival when moving past dams and through reservoirs. By issuing section 10(a)(1)(A) scientific research permits, NMFS will cause information to be acquired that will enhance the ability of resource managers to make more effective and responsible decisions to sustain anadromous salmonid populations that are at risk of extinction, to mitigate impacts to endangered and threatened salmon and steelhead, and to implement recovery efforts. The resulting data for research authorized under permit 1410 will

provide potential benefits to endangered and threatened salmon and steelhead by helping managers better understand factors controlling estuarine and marine survival.

Permit Specific Effects

In addition to the effects discussed above, the permit's proposed activity may have additional adverse effects that need to be analyzed. Researchers will use measures required through the permit conditions discussed previously to mitigate such adverse impacts on listed ESUs.

In the "Status of the Species" section both juvenile and adult population abundance is discussed. In the following section NMFS analyzes the impacts of the take numbers in the context of those numbers.

Permit 1410 would authorize the NWFSC to intentionally kill up to ten juvenile Ozette Lake sockeye salmon during a series of trawls in the nearshore environment off the mouth of the Columbia River. Although there are negative effects associated with killing listed fish, one should consider the fact that a great deal of information will be taken from the dead fish and used to develop a set of hydropower managment scenarios to benefit salmonid survival, growth, and health.

NMFS estimates an outmigration of approximately 350,890 juvenile naturally produced Ozette Lake sockeye salmon. Because the captured fish will be intentionally killed, adverse effects must be expressed in terms of the individual fish killed during the permitted activities. If the total amount of estimated lethal take for the research activities—ten juvenile Ozette Lake sockeye salmon per year—is expressed as a fraction of the 350,890 fish expected to emigrate from their natal habitat, it represents a loss of 0.003% of the run. However, and for a number of reasons, that number is probably fewer. First, as stated earlier in the Opinion, the anticipated outmigration of Ozette Lake sockeye salmon is a very conservative estimate. Second, it is important to remember that estimates of lethal take for the proposed study has purposefully been inflated and it is therefore very likely that fewer than 10 juveniles will be killed by the research. Therefore the 0.003% figure was derived by (a) underestimating the actual number of outmigrating Ozette Lake sockeye salmon smolts, and (b) overestimating the number of fish likely to be killed. Thus the actual number of Ozette Lake sockeye salmon the research is likely to kill is smaller than 0.003% per year.

But even if the entire 0.003% of the juvenile Ozette Lake sockeye salmon population were killed, it would be very difficult to translate that number into an actual effect on the species. Even if the subject were one adult killed out of a population of one thousand it would be hard to resolve an adverse effect. And in this instance, that effect is even smaller because the loss of a smolt is not equivalent to the loss of an adult in terms of species survival and recovery. This is

due to the fact that a great many smolts die before they can mature into adults. Therefore the research will have no measurable adverse effect on the ESU.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions (not involving Federal activities) that are reasonably certain to occur within the action area of this consultation. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

State, tribal and local government actions will likely be in the form of legislation, administrative rules or policy initiatives. Government and private actions may include changes in land and water uses, including ownership and intensity, any of which could impact listed species or their habitat. Government actions are subject to political, legislative and fiscal uncertainties. These realities, added to geographic scope of the action area which encompasses numerous government entities exercising various authorities and the many private landholdings, make any analysis of cumulative effects difficult and frankly speculative. This section identifies representative actions that, based on currently available information, are reasonably certain to occur. It also identifies some goals, objectives and proposed plans by government entities. However, NMFS is unable to determine at this point in time whether any proposals will in fact result in specific actions.

Representative State Actions

The Washington state government is cooperating with other governments to increase environmental protection for listed ESUs, including better habitat restoration, hatchery and harvest reforms, and water resource management. There are other proposals, rules, policies, initiatives, and government processes that help conserve marine resources in Washington, improve the habitat of listed species, and assist in recovery planning that are too numerous to mention. These programs could benefit the listed species if implemented and sustained.

In the past, Washington state's economy was heavily dependent on natural resources, with intense resource extraction activity. Changes have occurred in the last decade and are likely to continue with less large scale resource extraction, more targeted extraction methods, and significant growth in other economic sectors. Continued impacts affecting habitat features, such as water quality and quantity, which are important to the survival and recovery of the listed species need to be carefully planned for and mitigated through the initiatives and measures described above.

Local Actions

Local governments will be faced with similar but more direct pressures from population pressures. There will be demands for intensified development in rural areas as well as increased demands for water, municipal infrastructure and other resources. The reaction of local governments to such pressures is difficult to assess at this time without certainty in policy and funding. In the past, local governments in the action area generally accommodated additional growth in ways that adversely affected listed fish habitat allowing for development to destroy wetlands, habitat, etc.

Some local government programs, if submitted, may qualify for a limit under the NMFS' July 20, 2000 ESA section 4(d) rule (50 CFR 223.203) which is designed to conserve listed species. Local governments also may participate in regional watershed health programs, although political will and funding will determine participation and therefore the effect of such actions on listed species. Overall, without comprehensive and cohesive beneficial programs and the sustained application of such programs, it is likely that local actions will have few measurable positive effects on listed species and their habitat, and may even contribute to further degradation.

Tribal Actions

The decline of Ozette Lake sockeye salmon abundance over the past century has prevented the Tribe from conducting any Treaty-reserved sockeye salmon fisheries in the Ozette Lake Basin for almost 20 years. The Makah Tribe intends to rebuild the Ozette Lake sockeye salmon resource to the point where it will again be possible to conduct meaningful, ceremonial, subsistence, and commercial Treaty fisheries in the Ozette Lake Basin. Currently, the Makah Tribal government participates in cooperative efforts involving watershed and basin planning designed to improve fish habitat and is expected to continue to do so.

Private Actions

The lake is located within Olympic National Park, and development of Basin resources for residential and commercial uses is therefore relatively low. However, private timber corporations own the majority of the Ozette Lake watershed (Dlugokenski et al.1981; Figure 1). In addition, Ozette Lake is used by local residents and the National Park Service as a domestic water source (Dlugokenski et al. 1981).

The effects of private actions are the most uncertain. Private landowners may convert current use of their lands, or they may intensify or diminish current uses. Individual landowners may voluntarily initiate actions to improve environmental conditions, or they may abandon or resist any improvement efforts. Their actions may be compelled by new laws, or may result from growth and economic pressures. Changes in ownership patterns will have unknown impacts.

Summary

Non-federal actions on listed species are likely to continue affecting listed species. The cumulative effects in the action area are difficult to analyze considering the geographic landscape of this opinion, the uncertainties associated with government and private actions, and the changing economies of the region. Whether these effects will increase or decrease is a matter of speculation; however, based on the trends identified in this section, the adverse cumulative effects are likely to increase. Although state, Tribal and local governments have developed plans and initiatives to benefit listed fish, they must be applied and sustained in a comprehensive way before NMFS can consider them reasonably foreseeable in its analysis of cumulative effects.

CONCLUSIONS

After reviewing the current status of threatened Ozette Lake sockeye salmon, the environmental baseline for the action area, the effects of the proposed section 10(a)(1)(A) permit action, and cumulative effects, it is NMFS' biological opinion that issuance of the permit as proposed, and the funding of the proposed activities by the BPA, are not likely to jeopardize the continued existence of threatened Ozette Lake sockeye, nor destroy or adversely modify their habitat.

Coordination with the National Ocean Service

The activities contemplated in this Biological Opinion will not be conducted in or near a National Marine Sanctuary. Therefore, these activities will not have an adverse effect on any National Marine Sanctuary.

Reinitiation of Consultation

Consultation must be reinitiated if: The amount or extent of annual take is exceeded or is expected to be exceeded; new information reveals effects of the actions that may affect the ESA-listed species in a way not previously considered; a specific action is modified in a way that causes an effect on the ESA-listed species that was not previously considered; or a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

MAGNUSON-STEVENS ACT ESSENTIAL FISH HABITAT CONSULTATION

"Essential fish habitat" (EFH) is defined in section 3 of the Magnuson-Stevens Act (MSA) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." NMFS interprets EFH to include aquatic areas and their associated physical, chemical, and biological properties used by fish that are necessary to support a sustainable fishery and the contribution of the managed species to a healthy ecosystem. EFH has been designated for Pacific salmon, groundfish, and coastal pelagic species. For information on EFH for these species, please see this website: http://www.nwr.noaa.gov/1habcon/habweb/msa.htm.

The MSA and its implementing regulations at 50 CFR 600.920 require a Federal agency to consult with NMFS before it authorizes, funds, or carries out any action that may adversely affect EFH—in this case, EFH for Pacific salmon, groundfish, and coastal pelagic species. The purpose of consultation is to develop a conservation recommendation(s) that addresses all reasonably foreseeable adverse effects to EFH. Further, the action agency must provide a detailed, written response to NMFS within 30 days of receiving an EFH conservation recommendation. The response must include measures proposed by the agency to avoid, minimize, mitigate, or offset the impact of the activity on EFH. If the response is inconsistent with NMFS' conservation recommendation the agency must explain its reasons for not following the recommendation.

However, in this instance, no conservation recommendations are necessary. As the Biological Opinion above describes, the proposed research actions are not likely, singly or in combination, to adversely affect the habitat upon which Pacific salmon, groundfish, and coastal pelagic species depend. All the actions are of limited duration, minimally intrusive, and are entirely discountable in terms of their effects, short-or long-term, on any habitat parameter important to the fish.

The action agencies must reinitiate EFH consultation if plans for these actions are substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for the EFH conservation recommendations (50 CFR Section 600.920(k)).

The action agencies must reinitiate EFH consultation if plans for these actions are substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for the EFH conservation recommendations (50 CFR Section 600.920(k)).

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